

IN THE UNITED STATES PATENT  
AND TRADEMARK OFFICE  
APPLICATION FOR  
UNITED STATES UTILITY PATENT  
**METHODS FOR APPLYING WEAR-REDUCING MATERIAL  
TO TOOL JOINTS**

jc979 U.S. PTO  
10/057549  
01/23/02

Extra Set Drawings - 10 Sheets - For PTO Examiner

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BOLT CIP

Fig. 1A

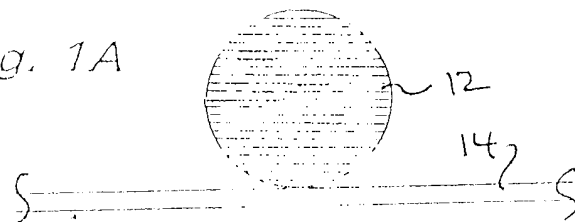


Fig. 1B

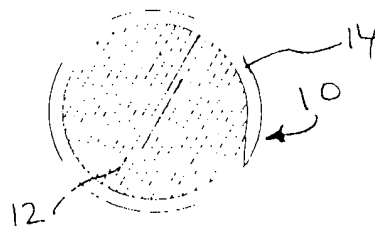


Fig. 2A

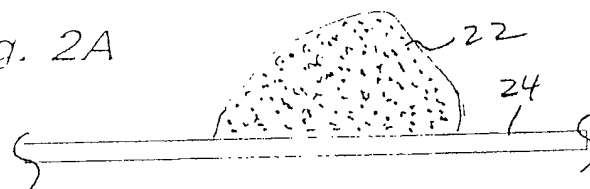


Fig. 2B

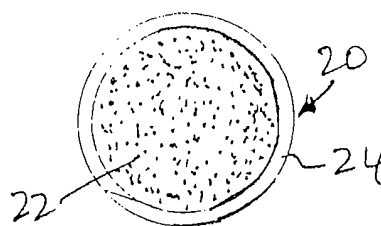


Fig. 3

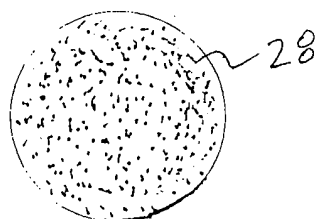


Fig. 4

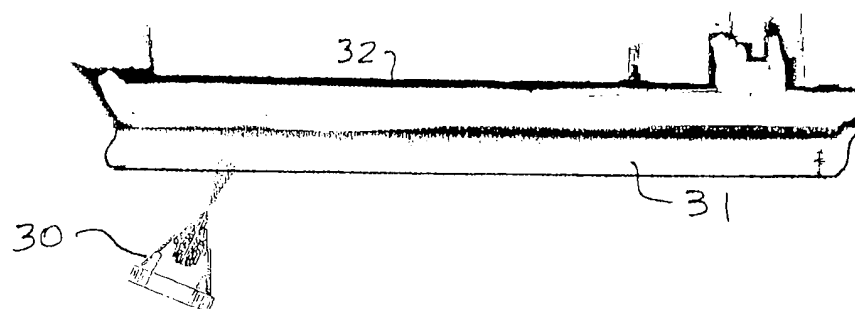


Fig. 5A

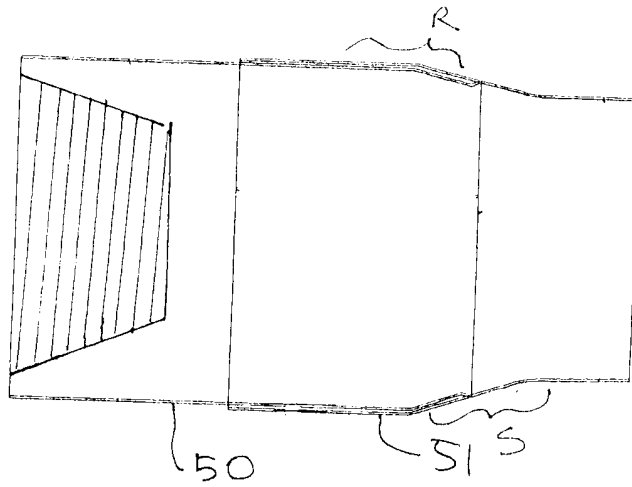


Fig. 5B

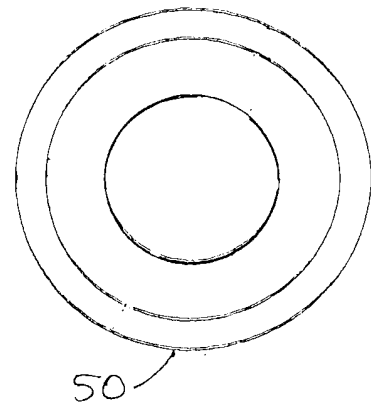


Fig. 6A

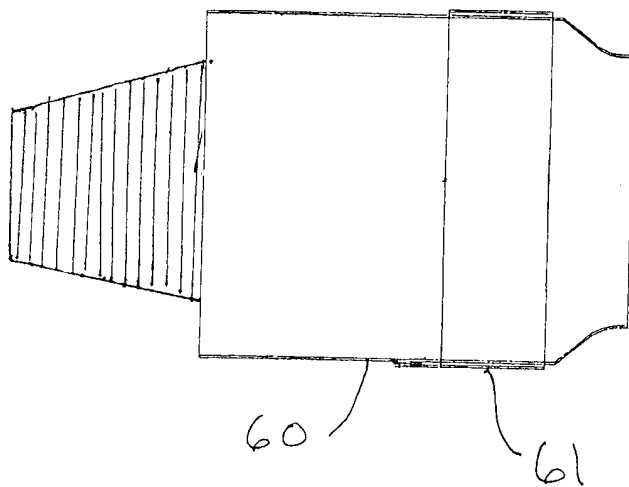


Fig. 6B

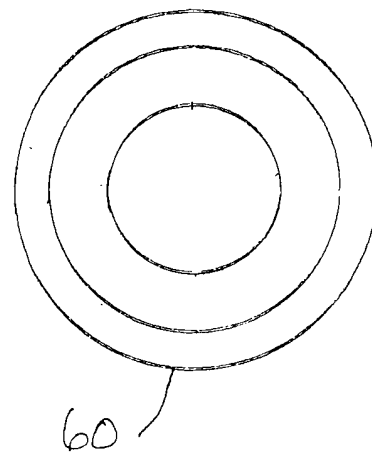


Fig. 7

Table I

Al A #	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti
1100	1.0 Si + Fe		0.20	0.05	---	---	---	0.10	---
2014	0.50- 1.2	1.0	3.9- 5.0	0.40- 1.2	0.20- 0.8	0.10	---	0.25	0.15
3004	0.30	0.7	0.25	1.0- 1.5	0.8- 1.3	---	---	0.25	---
4032	11.0- 13.5	1.0	0.50- 1.3	---	0.8- 1.3	0.10	0.50- 1.3	0.25	---
4043	4.5- 6.0	0.8	0.30	0.05	0.05	---	---	0.10	0.20
5050	0.40	0.7	0.20	0.10	1.0- 1.8	0.10	---	0.25	---
6063	0.20- 0.6	0.35	0.10	0.10	0.45- 0.9	0.10	---	0.10	0.10
7075	0.50	0.7	1.2- 2.0	0.30	2.1- 2.9	0.18- 0.40	---	5.1- 6.1	0.20

Fig. 9

Table III

Common Name	Nominal Chemistry	Trade Name
Pure Zinc		
AG40A Alloy	4% Al - 0.04% Mg	Zanak-3 (die casting)
AC41A Alloy	4% Al - 1% Cu - 0.04% Mg	Zamak-5 (die casting)
Zinc-base slush-casting alloy	4.75% Al - 0.25% Cu	
Zinc-base slush-casting alloy	5.5% Al	
Commercial rolled zinc	0.08% Pb	Deep drawing zinc
Commercial rolled zinc	0.06% Pb - 0.06% Cd	
Commercial rolled zinc	0.3% Pb - 0.3% Cd	
Copper-hardened rolled zinc	1% Cu	Zilloy-40
Rolled zinc alloy	1% Cu 0.10% Mg	Zilloy-15
Zn-Cu-Ti alloy	0.8% Cu - 0.15% Ti	

Fig. 8A

Table II

Common Name	Nominal Chemistry	Trade Name
Electrolytic copper	99.95 Cu - 0.04 O	Electrolytic tough pitch copper
Deoxidized copper, low residual phosphorous (DLP)	99.92 Cu 0.009 P	---
Deoxidized copper, high residual phosphorous (DHP)	99.95 Cu 0.02 P	Phosphorized copper; High residual phosphorous
Oxygen-Free Copper (OF)	99.95 Cu	---
Free-Machining Copper	0.5% Te	Tellurium copper
Free-Machining Copper	1.0 Pb	Leaded copper
Silver-Bearing Copper	No. oz / ton X 0.00343 for oz Ag	---
Gilding 95%	95 Cu - 5 Zn	Gilding metal
Commercial bronze 90%	90 Cu - 10 Zn	---
Jewelry bronze 87.5%	87.5 Cu - 12.5 Zn	---
Red brass 85%	85 Cu - 15 Zn	---
Low brass 80%	80 Cu - 20 Zn	---
Cartridge brass 70%	70 Cu - 30 Zn	Cartridge brass; Spinning brass; Spring brass
Yellow brass	65 Cu - 35 Zn	Drawing brass; Common high brass; Hoop brass
Muntz metal	60 Cu - 40 Zn	---
Leaded commercial bronze	89 Cu - 9 Zn 1.75 Pb	---
Low-leaded brass (tube)	66 Cu - 33.5 Zn 0.5 Pb	High brass; Yellow brass
Medium-leaded brass	65 Cu - 34 Zn 1 Pb	Butt brass; Matrix brass; Semi-lead brass; swaging brass
High-leaded brass (tube)	66 Cu - 33.4 Zn 1.6 Pb	Free-cutting tube brass; Leaded high brass
High-leaded brass	65 Cu - 33 Zn 2 Pb	Clock brass; Engraver's brass; Heavy-leaded brass

*Fig. 8B*

Table II - Cont'd

Common Name	Nominal Chemistry	Trade Name
Extra-high-loaded brass	63 Cu - 34.5 Zn - 2.5 Pb	---
Free-cutting brass	61.5 Cu - 35.5 Zn - 3 Pb	Free-turning brass; Free-cutting yellow brass; High-loaded brass
Leaded Muntz metal	60 Cu - 39.4 Zn - 0.6 Pb	---
Forging bronze	59 Cu - 39 Zn - 2 Pb	---
Architectural bronze	57 Cu - 40 Zn - 3 Pb	---
Inhibited Admiralty	71 Cu - 28 Zn - 1 Sn	Admiralty brass
Naval brass	60 Cu - 39.25 Zn 0.75 Sn	---
Leaded naval brass	60 Cu - 37.5 Zn 1.75 Pb - 0.75 Sn	Leaded naval brass, grade C
Manganese bronze	58.5 Cu - 39 Zn - 1.4 Fe 1 Sn - 0.1 Mn	---
Phosphor bronze, 5%	95 Cu - 5 Sn	---
Phosphor bronze, 8%	92 Cu - 8 Sn	---
Phosphor bronze, 10%	90 Cu - 10 Sn	---
Phosphor bronze, 1.25%	98.75 Cu - 1.25 Sn	---
Free-cutting phosphor bronze	88 Cu - 4 Pb 4 Sn - 4 Zn	444 bronze; Bearing bronze
Cupro-nickel, 30%	70 Cu - 30 Ni	---
Cupro-nickel, 10%	88.7 Cu - 10 Ni - 1.3 Fe	---
Nickel-silver, 65-18	65 Cu - 18 Ni - 17 Zn	---
Nickel-silver, 55-18	55 Cu - 27 Zn - 18 Ni	---
Nickel-silver, 65-12	65 Cu - 23 Zn - 12 Ni	---
High-silicon bronze	96 Cu - 3 Si	Copper-silicon alloy; High-silicon bronze
Low-silicon bronze	97.7 Cu - 1.5 Si	---

Fig. 8C

Table II - Cont'd

Common Name	Nominal Chemistry	Trade Name
Aluminum bronze	95 Cu - 5 Al	5% Aluminum bronze
Aluminum bronze	91 Cu - 7 Al - 2 Fe	---
Aluminum bronze	91 Cu - 9 Al	9% Aluminum bronze
Aluminum bronze	81.5 Cu - 9.5 Al 5 Ni - 2.5 Fe - 1 Mn	---
Aluminum-silicon bronze	91 Cu - 7 Al - 2 Si	---
Beryllium copper	97.9 Cu - 1.9 Be - 0.2 Ni or Co	Beryllium copper
Chromium copper	1% Cr	---
Tin bronze alloy	88 Cu - 10 Sn - 2 Zn	---
Tin bronze alloy	88 Cu - 8 Sn - 4 Zn	---
Tin bronze alloy	89 Cu - 11 Sn	Phosphor gear bronze
Navy M bronze alloy	88 Cu - 6 Sn 1 1/2 Pb - 4 1/2 Zn	Navy M, Steam or Valve bronze
Leaded tin bronze	87 Cu - 8 Sn - 1 Pb - 4 Zn	---
Leaded tin bronze	87 Cu - 10 Sn - 1 Pb - 2 Zn	---
High-lead tin bronze alloy	80 Cu - 10 Sn - 10 Pb	Bushing and Bearing bronze
High-lead tin bronze alloy	83 Cu - 7 Sn 7 Pb - 3 Zn	---
High-lead tin bronze alloy	85 Cu - 5 Sn 9 Pb - 1 Zn	---
High-lead tin bronze alloy	78 Cu - 7 Sn - 15 Pb	---
High-lead tin bronze alloy	70 Cu - 5 Sn - 25 Pb	---

Fig. 8D

Table II - Cont'd

Common Name	Nominal Chemistry	Trade Name
Leaded red brass alloy	85 Cu - 5 Sn 5 Pb - 5 Zn	Ounce metal; Composition metal
Leaded red brass alloy	83 Cu - 4 Sn 5 Pb - 7 Zn	Hydraulic bronze
Leaded semi-red brass	81 Cu - 3 Sn 7 Pb - 9 Zn	Valve metal
Leaded semi-red brass alloy	76 Cu - 3 1/2 Sn 6 1/2 Pb - 15 Zn	Plumbing goods brass
Leaded yellow brass alloy	72 Cu - 1 Sn 3 Pb - 24 Zn	High-copper yellow brass
Leaded yellow brass alloy	67 Cu - 1 Sn 3 Pb - 29 Zn	No. 1 yellow brass
Leaded yellow brass alloy	61 Cu - 1 Sn 1 Pb - 37 Zn	Die cast brass (ingot)
Manganese bronze (60,000 psi)	59 Cu - 0.75 Sn 0.75 Pb - 37 Zn 1.25 Fe - 0.75 Al - 0.75 Mn	Stem manganese bronze; Leaded high-strength yellow brass
Manganese bronze (65,000 psi)	57.5 Cu - 39.25 Zn 1.25 Fe - 1.25 Al - 0.25 Mn	High-strength yellow brass
Manganese bronze (90,000 psi)	64 Cu - 24 Zn 3 Fe - 5 Al - 4 Mn	---
Manganese bronze (110,000 psi)	64 Cu - 26 Zn - 3 Fe - 5 Al - 4 Mn	High-strength yellow brass
Aluminum bronze alloy	88 Cu - 3 Fe - 9 Al	---
Aluminum bronze alloy	89 Cu - 1 Fe - 10 Al	---
Aluminum bronze alloy	85 Cu - 4 Fe - 11 Al	---
Aluminum bronze alloy	81 Cu - 4 Fe - 11 Al 4 Ni	---
Aluminum bronze	82 Cu - 4 Fe - 9 Al 4 Ni - 1 Mn	Propeller bronze



*Fig. 8E*

Table II - Cont'd

Common Name	Nominal Chemistry	Trade Name
Nickel Silver (12% Ni)	57 Cu - 2 Sn - 9 Pb 20 Zn - 12 Ni	Leaded nickel brass; Benedict metal
Nickel Silver (16% Ni)	60 Cu - 3 Sn - 5 Pb 16 Zn - 16 Ni	Leaded nickel brass
Nickel Silver (20% Ni)	64 Cu - 4 Sn - 4 Pb 8 Zn - 20 Ni	Dairy bronze
Nickel Silver (25% Ni)	66.5 Cu - 5 Sn 1.5 Pb - 2 Zn - 25 Ni	Leaded nickel bronze
Silicon bronze	87 Cu - 4 Si - 1 Sn 4 Zn - 2 Fe - 1 Al - 1 Mn	---
Silicon brass	81 Cu - 4 Si - 15 Zn	---

Fig. 10

